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Anisotropy of permeability of reservoir rocks over Miaoli area, NW Taiwan.

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The amount of the CO_2 has risen since the Industrial Evolution. In order to reduce the amount of CO_2 in atmosphere, CO_2 sequestration is considered to be the most effective way. In recent years, research about subsurface storage of CO_2 into geological formations has increased rapidly. Assessment of storage capability is needed before selecting a site for sequestration. Porosity and permeability are important assessment factors for CO_2 sequestration in reservoir rocks. In order to improve the assessment, reservoir rock properties are important and need to be evaluated in advance. Porosity of sandstone is controlled by texture and degree of cementation, whereas permeability is controlled by pore-throat size, pore types and connectivity of pore throat. Sandstones of Miocene to Pleistocene in Miaoli area, NW Taiwan, were collected in this study. YOKO$_2$ porosity/permeability detector is used to measure their permeability perpendicular and parallel to bedding planes under 3 to 60MPa confining pressure with Helium as media. Optical microscope and scanning electron microscope (SEM) were then used to observe the mineral composition, lithology, texture and pore type of sandstones, so as to explore the influence of rock properties on porosity and anisotropy of permeability, as well as the storage potential for CO_2 sequestration in the future. The experimental results show that most of the horizontal permeability exceeds the vertical permeability and the anisotropy increases with increasing confining pressure. Mineral composition of sandstones studied were mainly quartz and lithic with little feldspar content. The pore types were mainly primary pores and micropores in this study. The correlation between quantity of macropores and permeability were higher than total porosity and permeability, mainly due to total porosity contains micropores which contribute little to permeability.